CLAIMS

1. (Currently amended) ~~An~~ A semiconductor device processing method, comprising the steps of:

(a) using a patterned photoresist to form a structure having at least one edge;

(b) prior to removal of the photoresist, forming a conforming layer from an organic compound and patterning the conforming layer to form at least one sidewall spacer which is self-aligned to the at least one edge;

(c) performing a processing operation which is at least partially localized by the at least one sidewall spacer; and

(d) removing the at least one sidewall spacer and the photoresist,

wherein the conforming layer is formed via deposition of at least one organic compound selected from C_1 to C_8 alkanes, C_2 to C_8 alkenes, C_3 to C_8 cyclo-alkanes, C_4 to C_8 cyclo-alkenes, C_1 to C_8 fluoro-alkanes, C_2 to C_8 fluoro-alkenes, C_3 to C_8 cyclofluoro-alkanes, C_4 to C_8 cyclofluoro-alkenes, or mixtures thereof,

wherein in the patterning the conforming layer to form at least one sidewall spacer, the patterning anisotropically removes substantially all of the conforming layer from surfaces other than the at least one edge.

2. (Original) The method of claim 1, wherein the conforming layer is formed from one or more gaseous alkanes, gaseous alkenes, gaseous fluoro-alkanes, gaseous fluoro-alkenes, or mixtures thereof.

3. (Original) The method of claim 2, wherein the conforming layer is formed from at least one compound selected from methane, ethane, propanes, butanes, pentanes, ethylene, propylene, butylenes, butadienes, tetrafluoromethane, trifluoromethane,

difluoromethane, fluoromethane, hexafluoroethane, tetrafluoroethylene, perfluorocyclobutene, hexafluorobutadiene, perfluorobutene, octafluorocyclobutane, or mixtures thereof.

4. (Original) The method of claim 1, wherein the conforming layer is formed via a deposition process selected from chemical vapor deposition, atomic layer deposition, plasma enhanced chemical vapor deposition, low pressure chemical vapor deposition, atmospheric pressure chemical vapor deposition, or rapid-thermal chemical vapor deposition.

5. (Original) The method of claim 1, wherein the conforming layer is formed via plasma deposition.

6. (Original) The method of claim 5, wherein the plasma deposition is conducted at a temperature in the range of about -40 to about 400°C.

7. (Original) The method of claim 5, wherein the plasma deposition is conducted at a power in the range of about 10 W to about 10,000 W.

8. (Original) A method for forming isolation structures, comprising the steps of:

(a) forming a patterned masking layer having at least one edge which overlies a substrate containing a body of semiconductor material;

(b) forming a conforming layer from an organic compound and patterning the conforming layer to form at least one spacer on the at least one edge of the masking layer;

(c) etching the substrate, in areas exposed by the masking layer and the sidewalls, to form said isolation structures;

(d) removing the spacers and the patterned masking layer;

(e) oxidizing the exposed portions of the semiconductor material; and

(f) filling the isolation structures with a dielectric material,

wherein the conforming layer is formed via deposition of at least one organic compound selected from C_1 to C_8 alkanes, C_2 to C_8 alkenes, C_3 to C_8 cyclo-alkanes, C_4 to C_8 cyclo-alkenes, C_1 to C_8 fluoro-alkanes, C_2 to C_8 fluoro-alkenes, C_3 to C_8 cyclofluoro-alkanes, C_4 to C_8 cyclofluoro-alkenes, or mixtures thereof.

9. (Original) The method of claim 8, wherein the conforming layer is formed from one or more gaseous alkanes, gaseous alkenes, gaseous fluoro-alkanes, gaseous fluoro-alkenes, or mixtures thereof.

10. (Original) The method of claim 9, wherein the conforming layer is formed from at least one compound selected from methane, ethane, propanes, butanes, pentanes, ethylene, propylene, butylenes, butadienes, tetrafluoromethane, trifluoromethane, difluoromethane, fluoromethane, hexafluoroethane, tetrafluoroethylene, perfluorocyclobutene, hexafluorobutadiene, perfluorobutene, octafluorocyclobutane, or mixtures thereof.

11. (Original) The method of claim 8, wherein the conforming layer is formed via a deposition process selected from chemical vapor deposition, atomic layer deposition, plasma enhanced chemical vapor deposition, low pressure chemical vapor deposition, atmospheric pressure chemical vapor deposition, or rapid-thermal chemical vapor deposition.

12. (Original) The method of claim 8, wherein the conforming layer is formed via plasma deposition.

13. (Original) The method of claim 12, wherein the plasma deposition is conducted at a temperature in the range of about -40 to about 400°C.

14. (Original) The method of claim 12, wherein the plasma deposition is conducted at a power in the range of about 10 W to about 10,000 W.

15. (Original) A method for forming contacts or vias in an integrated circuit structure, comprising the steps of:

(a) forming transistor structures in a substrate which contains a body of semiconductor material;

(b) forming a dielectric over the substrate and the transistor structures;

(c) depositing and patterning a resist material to form holes there through which expose portions of the dielectric in which contacts or vias are to be formed;

(d) forming a conforming layer from an organic compound and patterning the conforming layer to form sidewall spacers on the interior of the holes, whereby the diameter of the holes is reduced;

(e) etching the dielectric, in the areas exposed by said holes, to expose an underlying conductive structure; and

(f) removing the resist material and the sidewall spacers,

wherein the conforming layer is formed via deposition of at least one organic compound selected from C_1 to C_8 alkanes, C_2 to C_8 alkenes, C_3 to C_8 cyclo-alkanes, C_4 to C_8 cyclo-alkenes, C_1 to C_8 fluoro-alkanes, C_2 to C_8 fluoro-alkenes, C_3 to C_8 cyclofluoro-alkanes, C_4 to C_8 cyclofluoro-alkenes, or mixtures thereof.

16. (Original) The method of claim 15, wherein the conforming layer is formed from one or more gaseous alkanes, gaseous alkenes, gaseous fluoro-alkanes, gaseous fluoro-alkenes, or mixtures thereof.

17. (Original) The method of claim 16, wherein the conforming layer is formed from at least one compound selected from methane, ethane, propanes, butanes, pentanes, ethylene, propylene, butylenes, butadienes, tetrafluoromethane, trifluoromethane, difluoromethane, fluoromethane, hexafluoroethane, tetrafluoroethylene, perfluorocyclobutene, hexafluorobutadiene, perfluorobutene, octafluorocyclobutane, or mixtures thereof.

18. (Original) The method of claim 15, wherein the conforming layer is formed via a deposition process selected from chemical vapor deposition, atomic layer deposition, plasma enhanced chemical vapor deposition, low pressure chemical vapor deposition, atmospheric pressure chemical vapor deposition, or rapid-thermal chemical vapor deposition.

19. (Original) The method of claim 15, wherein the conforming layer is formed via plasma deposition.

20. (Original) The method of claim 19, wherein the plasma deposition is conducted at a temperature in the range of about -40 to about 400°C.

21. (Original) The method of claim 19, wherein the plasma deposition is conducted at a power in the range of about 10 W to about 10,000 W.